

**Amendments to the Drawings**

Applicants herewith submit replacement sheet "1/2" to replace sheet "1/2" now on file in the application.

Fig. 1 of sheet "1/2" has been amended to indicate that the process flow scheme shown therein falls within the "prior art" as required by MPEP §608.02(g). Fig. 1 has also been amended by adding reference number "3". Fig. 2 has not been changed.

Applicants respectfully request entry of replacement drawing sheet "1/2".

**Remarks**

Applicants have amended claims 1 and 19 and cancelled claim 18. Upon entry of this amendment, claims 1-17 and 19-23 will be pending.

**Claim Amendments**

Claim 1 has been amended to incorporate the requirement of cancelled claim 18 that the corresponding organic feed material be selected from mono C<sub>1</sub> to C<sub>4</sub> alkyl esters of C<sub>4</sub> to C<sub>12</sub> unsaturated dicarboxylic acids and/or anhydrides, di-(C<sub>1</sub> to C<sub>4</sub>) alkyl esters of C<sub>4</sub> to C<sub>12</sub> unsaturated dicarboxylic acids and/or anhydrides, lactones of C<sub>4</sub> to C<sub>12</sub> unsaturated hydroxycarboxylic acids and mixtures of two or more thereof. In addition, claim 1 has been amended by removing the phrase "operating under reaction conditions."

**Rejection of Claims 1-23 as Indefinite under 35 U.S.C. § 112, ¶2**

Applicants respectfully request reconsideration of the rejection of claims 1-23 as indefinite under 35 U.S.C. § 112, second paragraph. Applicants submit that claim 1 and claims depending therefrom are not indefinite as they particularly point out and distinctly claim the subject matter applicants regard as their invention.

The rejection of claim 1 for inclusion of the phrase "operating under reaction conditions" has been obviated by deletion of the phrase from the claim.

Applicants submit that the phrase "depleted hydrogen-containing stream" is clear as used in the context of the application. The reaction scheme involved in the process of the

present invention (See "Scheme 1" on p. 3 and the following paragraph) may involve a hydrogenation reaction (reaction 1), hydrogenolysis reaction (reaction 2) and dehydration reaction (reaction 3), each reaction consuming hydrogen. Further, the processes depicted in Fig. 2 and Fig. 3 include make-up hydrogen lines 19, 31 and 31a. In light of this disclosure, the skilled artisan clearly understands that the depleted hydrogen-containing stream is depleted in an amount of hydrogen relative to other hydrogen-containing streams upstream of the reaction zone. Accordingly, the scope of the subject matter defined by the claims is clear and claim 1 complies with 35 U.S.C. § 112, second paragraph.

**Rejection of Claims 1-18 and 20-23 for Lack of Enablement under 35 U.S.C. § 112, ¶1**

Applicants respectfully request reconsideration of the rejection of claims 1-18 and 20-23 as not enabled under 35 U.S.C. § 112, first paragraph. Applicants submit that the rejection should be withdrawn by the Office on the basis of the amendment to claim 1 that the organic feed material be selected from mono C<sub>1</sub> to C<sub>4</sub> alkyl esters of C<sub>4</sub> to C<sub>12</sub> unsaturated dicarboxylic acids and/or anhydrides, di-(C<sub>1</sub> to C<sub>4</sub>) alkyl esters of C<sub>4</sub> to C<sub>12</sub> unsaturated dicarboxylic acids and/or anhydrides, lactones of C<sub>4</sub> to C<sub>12</sub> unsaturated hydroxycarboxylic acids and mixtures of two or more thereof. Production of an ether optionally with a diol and or a lactone from the selected starting material would not require undue experimentation. The selection significantly limits the breadth of claim 1 and

warrants reconsideration and withdrawal of the enablement rejection.

Regardless of the amendment to claim 1, applicants respectfully offer the following comments regarding the discussion of *In re Wands* factors appearing in the Office action. As a matter of Patent Office practice, a specification disclosure that contains a teaching of the manner and process of making and using the invention in terms that correspond to those used in describing and defining the subject matter sought to be patented **must** be taken as in compliance with the enablement requirement of the first paragraph of § 112 **unless** there is reason to doubt the objective truth of the statements contained therein which must be relied on for enabling support. *In re Marzochhi*, 439 F.2d 220, 223, 169 USPQ 367, 369 (CCPA 1971). It is incumbent upon the Patent Office to explain why it doubts "the truth of any statement in a supporting disclosure and to back up assertions of its own with acceptable evidence or reasoning which is inconsistent with the contested statement." *Id.*, 439 F.2d at 224, 169 USPQ at 370. Accordingly, in order to establish a *prima facie* case of lack of enablement with respect to claim 1 as amended, the Office must meet this standard. Applicants respectfully submit this standard can not be met as to claim 1, as amended, and request withdrawal of the rejection of the pending claims under 35 U.S.C. § 112, first paragraph, as lacking enablement.

Applicants also request reconsideration of dependent claims 20-22 as not enabled under 35 U.S.C. § 112, first paragraph. Claims 20-22 directly or indirectly require the feed to be one

or more unsaturated acids and/or anhydrides and require an esterification step.

The specification clearly enables the esterification step by incorporating PCT Publication No. WO-A-90/08127. The specification indicates at page 16, lines 4-7 that the organic feed material "may be supplied from an esterification plant (not shown) of the type described in WO-A-90/08127 which is incorporated herein by reference." PCT Publication No. WO-A-90/08127 is directed to production of carboxylic acid esters by esterification of a mono-, di- or polycarboxylic acid with an alcohol or phenol component. Because the disclosure of PCT Publication No. WO-A-90/08127 was incorporated by reference, its disclosure "is as much a part of the application as filed as if the text was repeated in the application, and should be treated as part of the text of the application as filed." MPEP § 2163.07(b). Because of the extensive disclosure of the PCT Publication No. WO-A-90/08127 which is incorporated in the present application and because its disclosure forms part of the state of the art existing at the filing date of the application which is used to determine whether a particular disclosure is enabling as of the filing date (See MPEP § 2164.05(a)), the esterification step of claims 20-22 is enabled and the claims comply with 35 U.S.C. § 112, first paragraph.

**Rejection of Claims 1-23 as Anticipated under 35 U.S.C. § 102(a) or § 102(e)**

Applicants respectfully request reconsideration of the rejection of claims 1-23 as anticipated under 35 U.S.C. § 102(a) or §102(e) by U.S. Patent No. 6,936,727 issued to Suttén et al.

("the '727 patent"). The European Patent Office as the International Searching Authority found that claims 1-23 of the international application PCT/GB2004/005054, corresponding to claims 1-23 of the present application before amendment, were patentable in the written opinion dated February 22, 2005.

Claim 1, as amended, is directed to a process for the production of an ether optionally with a diol and/or a lactone. The ether is produced by reaction of a corresponding organic feed material selected from mono C<sub>1</sub> to C<sub>4</sub> alkyl esters of C<sub>4</sub> to C<sub>12</sub> unsaturated dicarboxylic acids and/or anhydrides, di-(C<sub>1</sub> to C<sub>4</sub>) alkyl esters of C<sub>4</sub> to C<sub>12</sub> unsaturated dicarboxylic acids and/or anhydrides, lactones of C<sub>4</sub> to C<sub>12</sub> unsaturated hydroxycarboxylic acids, and mixtures of two or more thereof in the presence of hydrogen. A stream comprising at least a portion of the organic feed material is supplied to a pre-reactor zone comprising catalyst and the feed is contacted with a hydrogen containing stream to saturate at least some of the carbon carbon double bonds. The at least partly saturated feed is vaporised into the hydrogen containing stream in a vaporising zone and supplied to a reaction zone comprising catalyst. A product stream comprising the ether and optionally diol and/or lactone is recovered from the reaction zone. A depleted hydrogen-containing stream is recycled to at least the pre-reactor zone or the vaporisation zone.

According to the principles of the present invention as claimed, by saturating at least a portion of the organic feed material in a pre-reactor prior to vaporisation, the heat of reaction may be utilized to evaporate a portion of the liquid feed thus reducing the adiabatic temperature rise across the

vaporiser and allowing for an increase in recycle loading for a given exit reactor temperature. See application at page 6, lines 18-22 and page 8, line 14 to page 9, line 11.

The '727 patent is directed to the production of ethers. According to the '727 patent and as illustrated in Fig. 2 thereof, the process comprises supplying a stream comprising organic feed material selected from dicarboxylic acids and/or anhydrides, monoesters of dicarboxylic acids and/or anhydrides, diesters of dicarboxylic acids and/or anhydrides, lactones, and mixtures of two or more thereof to a first vaporisation zone 20. The feed is contacted with cycle gas 21 comprising hydrogen such that at least a portion of the feed material is vaporised by and into the cycle gas. At least a portion of the cycle gas and the vaporised feed material are supplied to a first reaction zone 25 to allow hydrogenation and dehydration to occur. An intermediate product stream 26 comprising unreacted feed material, cycle gas, desired product(s), and any co-products and by-products is recovered from the first reaction zone 25. The intermediate product stream 26 is supplied to a second vaporisation zone 27 and contacted with additional feed material 28 such that the additional feed material 28 is vaporised by and into the intermediate product stream 26. This mixture 30 is supplied to a second reaction zone 31 to allow hydrogenation and, if required, dehydration to occur. A product stream 32 comprising the ether is recovered from the second 31 reaction zone.

The reference fails to disclose a process wherein organic feed material is supplied to a pre-reactor to saturate some of the carbon carbon double bonds followed by vaporisation of the

at least partially saturated feed. According to the process of the '727 patent, organic feed material is first fed to either the first vaporisation zone 20 or the second vaporisation zone 27 rather than to a pre-reactor where at least some saturation of carbon carbon double bonds occurs as in the claimed process. While the '727 patent does disclose two reaction zones, the first reaction zone involves conversion of organic feed material to the desired product ether optionally with diol and/or lactone rather than conversion to the saturated ester. Because the organic feed material is vaporised prior to reaction, the process of the '727 patent can not attain the advantages attendant the claimed process, namely utilization of the heat of the saturation reaction to evaporate a portion of the liquid feed.

In view of the above, the processes defined in claims 1-17 and 19-23 are submitted as novel and patentable over the disclosure in the '727 patent.

**Rejection of Claims 1-23 under the Doctrine of Nonstatutory Obviousness-type Double Patenting**

Applicants respectfully request reconsideration of the rejection of claims 1-23 under the doctrine of nonstatutory obviousness-type double patenting over claims 1-15 of the '727 patent.

Contrary to the assertion by the Office, the claimed subject matter is not disclosed in the patent and, more particularly, is not disclosed in claims 1-15 of the '727 patent. Nowhere do claims 1-15 of the '727 patent teach or suggest a process for producing ether wherein organic feed

material is supplied to a pre-reactor to saturate some of the carbon carbon double bonds and vaporisation of the at least partially saturated feed. Applicants respectfully request withdrawal of the double patenting rejection because the Office has failed to articulate how the skilled artisan would arrive at the claimed process from claims 1-15 of the '727 patent.

Applicants respectfully request allowance of pending claims 1-17 and 19-23.

Applicants authorize the Commissioner to charge any government fees which may be required including a one month extension of time to Deposit Account No. 19-1345.

Sincerely,

/Michael J. Vander Molen/

Michael J. Vander Molen, Reg. No. 57,274  
Senniger Powers LLP  
One Metropolitan Square, 16th Fl.  
St. Louis, Missouri 63102  
(314) 231-5400

MJV/arc